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ARIZONA
SHEEP GRAZING



IRRIGATION
AND FORESTRY

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IN THE PINERIES NEAR DU BOIS, PENNSYLVANIA.

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Massachusetts Forestry Association.

What It Is and What It Does; Some Suggestions for Similar Organizations in other States.

BY THE SECRETARY OF THE ASSOCIATION.

In talking with a Southern gentleman at the National Capital within the past year I was told that "Massachusetts has had her day, and in the present hour she cuts but a small figure in these United States."

Perhaps Massachusetts people will be unwilling to accept this statement in its widest application, but we must admit that in point of proportional forest resources we are sadly behind many of our sister States. This, of course, is in a measure due to the fact that the State is very generally fertile, and, as we understand the principles of forestry, it is not desirable, as a rule, to hold in timber and cordwood the land which is capable of growing other crops more profitably.

By the census returns of 1895 (the latest available statistics on this subject) it appears that the woodland area of this State is nearly a million and a half acres, and that its valuation is almost \$24,000,000. This is a gain of over 71,000 acres in ten years, but the valuation shows a depreciation of more than \$1,300,000 in a like period, notwithstanding the increased acreage. In point of valuation our woodland is to-day some \$440,000 ahead of what it was thirty years ago, and the acreage shows almost identically the same figures in increase. On the whole, judging from the census returns of woodlands of various classes,

their character appears to have improved in the ten years, from 1885 to 1895, but the depreciation of considerably more than a million dollars in value in that time seems to indicate that further improvement is possible.

As to the so-called unimproved and unimprovable land of the State, which includes permanent pastures, swamps and other waste country, it is pleasing to note that its area has declined since 1885 by nearly 250,000 acres. It is not so reassuring, however, to note that the value has shrunk by nearly \$4,000,000, which seems out of proportion to the loss in area. This loss is not offset by any gain in arable land, for there has been a loss in area in that class, and with a gain in valuation notwithstanding. It is not offset by the gain of 71,000 acres in woodland, for that is less than one-third of the total loss of unimproved and unimprovable lands. Some of this unimproved land has, no doubt, gone into residential property, but the tremendous loss in valuation still remains.

"But why all these dry-as-dust statistics?" some one asks. It is to show more clearly one reason why the Massachusetts Forestry Association exists. The problem in this State is, not to increase our wooded area as a whole, necessarily, but to make the most of what we have in the way of growing trees, and in

making lands which are worthless for other purposes, yield a revenue both to their owners and to the Commonwealth.

This is the home problem. Beyond our political borders we have a natural interest in wide areas of commercially valuable forest in the States to the north. Massachusetts is dependent on those forests in many ways. Many of the streams which rise in their midst furnish water power to important manufacturing interests in Massachusetts. Those forests have a more or less direct bearing also on the general commercial prosperity of Massachusetts, inasmuch as Boston is the business center of New England. If the forests are mismanaged and wrecked, many lines of business enterprise in Massachusetts will be seriously affected. It is impossible, however, for a Massachusetts association to exert any direct influence in other States, but its Forestry Association hopes to be able to inspire citizens in those States to act for themselves and to assist in the work as far as it may be permitted.

At the time that the initial conferences were being held looking to the formation of the Massachusetts Forestry Association, the organizers placed themselves on record to the effect that unless the Association could have influential support, both moral and material, its field would be restricted and its services be practically valueless. It must be a business corporation in every sense of the word, but any profits which may accrue belong, not to the corporate members as such, but to the Commonwealth of Massachusetts and to New England at large. As an earnest of this spirit one gentleman subscribed \$1,100 on the spot. Since then four others have done likewise. These donations of \$1,000 and the life membership fees are invested in the permanent fund, which it is hoped will shortly be swelled by other donations, that the Association may be enabled to enter upon its career of greater usefulness.

The Association was barely on its feet and trying its first steps when the hurri-

cane of war swept down upon the land, and the child was obliged to retire and wait for the storm to pass. At the time of the incorporation, which was in June, 1898, the membership numbered one patron (a subscriber of \$1,000 or more), four life members, and some thirty annual members. Almost immediately after the cessation of hostilities with Spain the Association arose once more, and applications for membership began to come in. The growth has ever since been steady and healthy and the rolls showed on the first of October 5 patrons, 18 life members, 239 annual members.

This growth seems to indicate that there is an intelligent public interest in the subject of forestry and tree-culture in Massachusetts, and the Association has been thus encouraged to apply its energies systematically to increase that interest. During the past Winter it has carefully prepared a bill providing for the codification and amendment of the laws relative to the preservation of trees, and has given its support to several other legislative measures bearing upon the forestal welfare of the Commonwealth. Most of the bills succeeded, but most important of all in the eyes of the Association was its own codification bill. This provided that every town in the State should annually elect a Tree Warden, who should have sole charge of and be held directly responsible for the roadside trees and shrubbery. The bill carefully defined his duties and increased his powers. Heretofore the election of a Tree Warden has been permissive merely, and not more than five or six towns ever availed themselves of the privilege. It is now mandatory with all towns. The law having been enacted, the Massachusetts Forestry Association will endeavor at once to interest responsible citizens in the several towns of the State in the necessity for choosing none but competent and public spirited men for the post, and offering whatever assistance the Association may be able to render once the Warden is duly installed in office. Naturally the Association cannot exert any influence in the

electioneering line, as it is not a political organization and has no desire to meddle with the private affairs of the towns. As the office carries no salary unless the towns see fit to provide one, none but public-spirited persons will seek the position.

The Tree Warden law is, of course, primarily for shade tree protection, but it will indirectly awaken an interest in the better management of woodlands and timber. The original draft of the bill also included a most important provision for a forest fire warden system, but this the legislative joint committee on agriculture did not see fit to report, on the ground that its provisions were too drastic. This matter must therefore be left for another year. That there is sore need of a more stringent fire law is shown by the records of the past Spring. Six towns, situated in various parts of the State, have thus far this year been subjected to heavy losses. Much of this destruction might have been prevented had there been an adequate law governing the setting of fires, defining a system for their prompt extinguishment, fixing the responsibility for their origin, and providing for the punishment of the offenders.

With a view to bringing the subject of forestry and of roadside tree culture more generally and more forcefully before the people of Massachusetts, in a plain way, the Association has spent the Summer months this year in securing an original set of photographs of existing conditions, ideal and otherwise, throughout the State, from which lantern slides may be made. Lectures will soon be prepared to accompany the pictures (for the pictures will carry greater conviction than mere words, and are therefore the primary factors), and next Winter will be started a campaign which it is hoped will be as successful as those which have been conducted in similar fashion in Pennsylvania and other States.

Another means of helping farmers in the improvement of their woodlots and in the planting to trees some of their valueless waste land, and for the gnid-

ance of Tree Wardens and others in caring for shade trees and roadside shrubbery, is found in a concise little book, which the Association expects to publish before long. This book is the work of Warren H. Manning, of the Executive Committee of the Association, and the funds for its publication are being subscribed by members and other interested persons.

In many other ways the Association has been and is still active. For example, a committee of business men has been hard at work for many weeks past in taking testimony from persons representing various lumber interests all over the country on the subject of a lumber tariff. They have studied the matter carefully and from all sides, and now report that the interests of our forests demand that foreign lumber of all kinds shall be admitted duty free. Another committee, composed of members living in the cities and towns infested by the notorious gypsy moth, has been engaged during the past Summer in following the State's work of attempting to exterminate this pest. This committee, after studying the work, will return a report to the next General Court, advising a continuation of the crusade in its present form, or suggesting some new plan of action in accordance with what it considers the interests of the State demand. The Association also furnishes articles relating to forestry and tree-culture to the daily press, and it is most encouraging to note the readiness of the papers generally to publish all such articles. In several instances these articles have been accorded positions in the editorial columns.

On the whole the outlook for a life of useful activity seems bright to the Massachusetts Forestry Association. It already possesses the courage to go ahead, and it needs only the active support of every interested citizen of the State to hasten the day when scientific forestry shall be as common as are destructive lumbering operations and forest fires at the present time.

ALLEN CHAMBERLAIN,
Winchester, Mass.

The Reclamation of Drifting Sand Dunes.

(GOLDEN GATE PARK, CALIFORNIA.)

Being a Paper Read at the Summer Meeting, Los Angeles, Cal., 1899.

(NUMBER SIX OF THE SERIES.)

About 700 of the 1,040 acres composing the reservation were originally acres of drifting sand that moved with every gale, heavy storms sometimes moving it to a depth of three feet in twenty-four hours. This sand is sharp and clean, with nothing in its composition of a loamy nature, barren and poor, so poor that barley sown on its surface, after being plowed and cultivated in a favorable season with plenty of moisture, grew only about six inches in height, and failed to perfect its seed, although perfectly protected from winds by a high embankment on its westerly side.

The first operation necessary in the reclamation of ground of this sterile nature, was to bind the sand to prevent its moving. Experiments were made by sowing barley, also by sowing seeds of the blue and yellow shrub lupin *Lupinus Arborea*, also by planting seeds of *Pinus Maritima*, all of which were partially successful; but the first complete success was with the planting of the entire area with the sea bent grass (*Calamagrestis Arenaria*), which was done by planting the roots about three feet apart, and run in with the plow. A furrow was run about fifteen inches deep, in which a few roots were dropped, about three feet apart; then two furrows were turned, in which no roots were set; in the third furrow roots were again planted, and so on over the entire tract. Where the dunes were too steep for horses to travel, pits were dug by hand and the roots planted the same distance apart as when the land was plowed, care being taken to firmly press with the foot the sand immediately about the roots. Moist or even wet weather is, of course, the best time to plant this grass, the best season for planting being between December 1 and February 15. If planting be de-

layed much later, dry weather is apt to set in before the plants become firmly rooted, and the consequence is many are lost either by drought or by being blown out by the winds.

Where any large areas of plants were blown out by the roots, care was taken to have the ground immediately replanted, a gang of men being sent after every storm to pick up the scattered roots and to plant them deeper if possible than before. The entire tract being planted with this grass, the next operation was the building of brush fences across the wind about 100 yards apart and from four to six feet in height, on the sheltered side of which young seedling trees were planted, averaging five feet apart. A variety of trees were experimented with, among which were the Norway Maple, which is so highly recommended in European works of reclamation; the Tamarix and the Poplar, the Monterey Cypress, the *Pinus Insignis*, the *Pinus Maritima*, the *Acacia Lophantha*, the *Acacia Latifolia* and the *Eucalyptus*, *Viminalis*, *Globularis*, etc. All these made satisfactory progress, excepting the Norway Maple and the Poplar, the summer winds blowing off every leaf, almost as soon as formed. The *Acacia Latifolia* and *Acacia Lophantha*, the Monterey Pine, the Monterey Cypress and the Tamarix are all about equally well adapted for standing exposed sea winds, and all seem to thrive equally well in the sand; but we find that the barren sand does not contain nutriment sufficient to grow trees more than ten feet in height, or until the tree begins to form heart wood.

About that stage of growth the tree begins to show signs of distress, the leaves of the conifers gradually grow shorter, the bark gets bound and the

whole tree shows a stunted, starved look. Acres and acres are now in that state, and unless given assistance will die outright. Several years ago the work of fertilizing the forest trees was begun, and wherever a load of loam, manure or other good rich dressing was spread, the hungry tree responded very quickly by making good growth, a more thrifty look was noticed, and in less than a year they had a vigorous, healthy look, showing that want of nourishment alone was the cause of their stunted appearance.

Now that the young Pines, Cypress, Eucalyptus, etc., are up twenty or more feet high, with good soil and plenty of water, most any tree that thrives in the neighborhood will do well. The Willow, the Elm and the Poplar, as well as the Oak and the Maple, are doing very well, and all of the shrubs, such as Rhododendrons, Azaleas and many others very well, indeed, protected as they are by the shelter of the hardier kinds.

JOHN McLAREN.

Minnesota's Park for the People.

Symposium of Views of the Forest Expert, the Lumberman and the Press.

Friends of forestry and others have long wished to have a portion of our northern Minnesota forest reserved as a park, health resort and game preserve. The Itasca State Park already created, of less than 20,000 acres, but for the increase of which the last legislature appropriated \$20,000, has realized this wish only in part.

Col. John S. Cooper, of Chicago, having come forward with a project of a "national park" of 7,000,000 acres, the happy audacity of his plan has aroused the interest and discussion which are desired.

I do not suppose that anything like 7,000,000 acres will be taken for a national park, but hope that a reasonably extensive area will be appropriated before interest in the subject subsides. The annual report of the Commissioner of the General Land Office shows that the United States still holds in northern Minnesota 6,000,000 acres of public land, stretching (though not all in a compact body) from the eastern limit on the north shore of Lake Superior to the Red River Valley, a distance of 350 miles. In the eastern and northern parts the surface is broken, and to some extent rocky. There are extensive swamps, mostly covered with stunted Spruce. But the region as a whole,

though perhaps of a sombre cast, abounds with clear lakes and streams, is a natural forest of Pine, Spruce and mixed woods; has always been, and still is, the covert of valuable game, and is well adapted from its prevailing sandy soil and coniferous foliage for a national park health resort. There are spots that are ideal for sylvan beauty.

Contiguous to these United States lands are, in round numbers, a million acres of valuable Pine and mineral lands belonging to private parties, and a million or more acres of cut-over lands belonging to private parties; also about three million acres of school and swamp lands belonging to the State of Minnesota as the gift of Congress. Of the 6,000,000 acres of United States lands, probably 3,000,000 acres are non-agricultural, yet suited for forestry.

I speak only for myself, but I favor a national park, and one just as extensive as it can reasonably be. I will not venture now to advise how it should be created. It might be by act of Congress authorizing the Secretary of the Interior to select and set apart all such tracts as are unsuited for agriculture, or a commission of disinterested and eminent men, such as selected and set apart the national forest reserves, might be authorized to create it. Under the latter

system is a method of eliminating all lands better suited for other purposes than for forestry. The authority that would be least liable to political and local influence would have my preference.

Much opposition to the proposed national park is being made by the newspapers of northern Minnesota from a mistaken apprehension that it will withdraw farming lands from settlement, obstruct lumbering and retard the general prosperity. In answer to this I have repeatedly, in various newspapers, cited the example of the Black Forest (so called from the dark color of its coniferous woods), a tract ninety miles long by from thirteen to forty miles wide, lying in Baden and Wurtemberg, and which, though essentially a forest, managed on forest principles, and a most popular health and summer resort, still has within its limits cities and villages, a population of a million, fine roads, manufactures and cultivated farms. The Thuringian and all other forests illustrate a similar fact that land which is better fitted for forest than for agriculture can be maintained as forest so as to yield a continuous revenue and afford the benefits of a park, without preventing the cultivation of any neighboring agricultural land. If I am not mistaken the Adirondacks, in which the State of New York now holds a million acres as a forest reserve and park, contains several villages, many private summer homes, good roads, and while affording all the benefits of a park, of a fish and game preserve, and of a summer resort, is the theater of active prosperity; and there can be no doubt whatever that if a reasonably extensive national park be established in northern Minnesota it will greatly increase rather than retard the general prosperity.

Under the free and easy public land system which the people, through their Congress and Government, have permitted, the timber lands in Minnesota, as well as elsewhere, have been disposed of in a prodigal manner. Within the past fifty years a hundred million dollars'

worth of Pine has been cut in Minnesota, for which the Government has received less than \$7,000,000. The greater and best part of the Pine forest has been cut; and now, if the people of the country at large wish to reserve a few groves of the remaining Pine belonging to the Government as a future health resort, it does not become any one to make too violent an opposition.

The lumbermen of Minnesota, as a class, are broad-minded and liberal, and will not oppose a suitable national park. But timber thieves and all such as "dead and down" timber rascals will oppose it and make their opposition felt. It is a question which concerns the public quite generally and ought to be decided promptly or it will be too late.

C. C. ANDREWS,

*Chief Fire Warden of Minnesota and
Secretary of the Minnesota State Forestry
Board.* St. Paul, Minn.

The Minnesota National Park and Forestry Association has set itself to the task of securing a national park for the plain people of the United States. In area, its acres will count by the millions, and in scenic and native conditions this combined forest reserve and park will be among the most picturesque and primal solitudes that are grouped around the headwaters of the Mississippi River. Its forests are magnificent and stately, the cascade and rivulet trickle down its slopes and gorges. It has lakes that silver spot its open landscapes, the air is crispy and bracing, it is easily accessible to some twenty millions of people, and for Nimrods, Waltons and tourists it has the savage beast, the game fish and a vestige of what is left of old America, and of unvandalized domain. It is proposed to keep the ruthless axe of the nomadic chopper out of the woods, and to spare the coming generation a gloomy vista of blackened stumps, and strangled streams and gorges filled with slashings or sawdust.

This forest is one of the few left east of the Rocky Mountains; but in all its

grim grandeur of massiveness and magnitude, it will be but a desolation of slabs and stumps and moss-covered charcoal in less than a decade if timber rapacity is not repressed. The movement now being made has forest preservation as one of its objects, and if an act of Congress can be secured to make national property of this splendid domain, the timber thief, the fire fiend, and some other repellant annexes to camps and saw mills, will give up the ghost or quit the country. The regulating of timber cutting will avert the climatic catastrophes that follow the wholesale destruction of forests the wide world over, and will give the people of the Mississippi Valley a domain as large as an ancient kingdom, where the debilitated can renew their strength, feast their eyes on landscapes tranquilizing and superb, or carry out their Nimrodic instincts to the haunt of the wolf and the den of the bear. It would seem that public opinion would be a unit in this movement, but, while it is not unanimous, there is sufficient weight and momentum to give the project a reasonable hope of success.

In the establishment of forest reserves and national parks the Government of the United States has confined itself to the Pacific coast and the extreme West, the whole making an aggregate of 40,000,000 acres. The Mississippi Valley has not had a Lazarus crumb from the tablecloth of Dives. It may be the country has grown too fast, and has ribbed out an empire before its juvenile mouth was filled with second teeth. It is no longer a stripling. It is now the commercial spine of a nation. It has turned the sod of the prairie, and made a patchwork of orchards and fields of the wilderness. It teems with life. The church is on the hill and the school house in the valley. The throats of furnaces breathe like Vesuvius. The chasms are bridged, the streams spanned, and steel rails spread a web of blue-white lines on mountain slopes and from sea to sea.

From the valley of the American Nile crowds of men and women make their

annual trips to the hills of New Hampshire, the rock-ribbed slopes of Old Maine, the gorges of the Adirondacks, the crags and woods of the White Mountains, to the Yosemite and the Yellowstone, and the white and yellow sand-lines of two oceans. What about a Minnesota diversion for Nimrods, Waltons and tourists? It is within twenty-four hours' reach of twenty millions of people, who, if rigid and forceful in their several avocations, are as eager and intent in their once-a-year go-out for health or rest, or in man-like quest of some sport or other that shakes the sawdust out of brains, and nerves the hand for the gun or the fishing-rod.

In a commercial sense, aside from all other considerations, a home park for the tribes of the Valley would be a magnet for the largest dollar ever made. It has been a matter of dispute with some as to whether or not this privilege would be abused. Would it become a monopoly, or a whole mob of monopolies, as has been the traditional practice of some sportsmen's clubs in securing the control of hunting and camping grounds? In this instance exclusiveness would be impossible. The Minnesota National Park would be for all the people. It will have no necktie or club button privileges, if the program as on the card is lived up to. Such an outing place as is proposed, if anywhere near the descriptions given of its natural characteristics, and if free from that yellow paint that too often gets on scenic maps, the Park of the Valley would be a godsend to its people and an honor to the nation.

The last of the great Pine timber tracts of the Northwest lies in the upper portion of Minnesota, a vast region of many thousand square miles which was once too remote from transportation to make the marketing of its lumber easily practical. Out by the port of Duluth, and south by the highway of the Mississippi River, and out also from the stations of the railroads which have been steadily invading that region, there have long

been coming the old streams of logs. Minnesota is by no means a new region for the lumberman, but a part of the State, more especially that covered by certain Indian reservations, is still uncut, and is looked on eagerly by the eyes of those men whose capital is invested in the lumber trade. The eastern and northwestern portions of Minnesota have been well logged off. The forest fires at Hinckley and elsewhere, which wiped out whole villages and destroyed scores of lives, show what possibilities of ruin there are latent in a slashed-off, abandoned lumber country. Little by little the axe and the saw have been working toward the last of the great Northwestern Pine forests.

It is not the purpose of this forestry organization to injure any existing property rights. It is the intention to be not unjust, but just, to the Indians who live in that country. It is not the intention to rob the State of Minnesota, or any citizen of that State in any particular, but to benefit that State and its citizens. The organization is not presumptuous enough to ask for any given limits for this national playground. The gentlemen of the organization have merely asked the members of Congress to come out and see that country, and then to decide the question whether it should belong to the people of America or be given over to the axe and saw of a few lumbermen, who must soon ruin it, as they have ruined the Pine tracts farther to the east.

The organization of the National Park and Forestry Association will give impetus to the general movement to save the forests in the States and Territories. There is now very little opposition to the plans inaugurated by the Government for the preservation of forests, and in most of the older States there is a strong sentiment in favor of a system under which the trees so ruthlessly destroyed in the timber States of the East may be replaced. In the prairie States much progress has been made.

The State of Minnesota, under its own forest laws, is taking some care of its forest lands, and each year a report of the wardens is submitted as to ravages of fire and destruction from other causes. Of the 11,890,000 acres of natural forest in the State 10,889,000 acres are in twenty-three counties. Seven million acres lie to the west of Duluth, and here the members of the new park association propose to establish a national park that shall preserve the natural forest, its plants and animals. The only opposition to this will come from those who believe that it would be against the interests of the State to reserve any great extent of wild land from settlement. This opposition may be overcome by the plan pursued in other States where parks have been located in a way not to interfere with the development of remote sections of the State.

The necessity for prompt action, in view of the rapidity with which large areas of forest are denuded of timber, is shown in the following press dispatches from that section of country:

"Two hundred men are now gathering in camps on Turtle River, north of Cass Lake, to cut 300,000,000 feet of Pine. The camps on the upper branches of the Mississippi, where 300,000,000 additional feet of Pine is to be cut, were established last year, and 35,000,000 feet has been driven down the Mississippi to Bemidji, and is now being loaded on cars—800,000 feet each day—and railroaded out of that region on the Brainerd & Northern.

"If the Ojibway Pine is sold to these lumbermen under the Nelson law, every Pine tree in the whole region, except at Itasca Lake, in the State Park, will be cut and turned into lumber before the expiration of the ensuing fifteen years at the present rate of destruction. It will then be absolutely impossible to prevent devastating and enormous forest fires similar to those which have heretofore occurred in the cut-off Pine regions of Minnesota."

The Congressional party invited to explore the country advocated for a Government reserve by the Minnesota National Park and Forestry Association, left Chicago Thursday, September 28, arrived in St. Paul the next morning, left the same evening over the Great Northern Railway, and at last accounts had reached Walker, Minn., where a houseboat was taken for a trip down Leech Lake. The original itinerary was changed so as to visit Otter Tail Point, where a council was being held by the Pillager and Chippewa Indians. After meeting several influential chiefs, the party returned to Walker for a banquet

in their honor in the evening. On Thursday, October 5, the party was expected to proceed by special train to Duluth, thence to Minneapolis and Chicago, concluding the journey on October 7.

The present plan of the Association is to ask that only 800,000 acres be set aside now, to begin the new park. This area would include seventy lakes of considerable size, besides several hundred small ones, with a number of square miles of finest White Pine trees. The settlers in this region have become enthusiastic supporters of the plan, since they have learned of its true scope.

The Example of Pennsylvania.

Reappointment of a Worthy Official in Spite of Political Clamor— Unanimous Approval by the Press.

The Governor of Pennsylvania, on September 18, reappointed for four years, as State Commissioner of Forestry, Dr. J. T. Rothrock, vice president of the American Forestry Association for Pennsylvania.

Joseph Trimble Rothrock was born in McVeytown, Mifflin County, Pa., April 9, 1839. He was graduated from Harvard University in 1854, and in 1868 received his medical degree from the University of Pennsylvania. From March, 1865, to November, 1866, he was engaged in exploration in British Columbia and in Alaska. He had previously served in the civil war. From 1869 to 1873 he was actively engaged in the practice of medicine in Wilkesbarre. From 1873 to 1876 he was surgeon and botanist to the Wheeler Exploring Expedition of the United States Engineering Corps and served in Colorado, Arizona, New Mexico and California. The University of Pennsylvania elected him Professor of Botany in 1876, which position he still holds, though granted leave of absence since 1893 to serve as Commissioner of Forestry of the State. He has delivered

many lectures in the interest of forestry, and has written several books on the subject.

Governor Stone has done the State a service and added luster to his administration by reappointing Joseph T. Rothrock as Commissioner of Forestry for another four years' term. This State first waked up to the necessity of doing something for the preservation and perpetuation of her forests about eight years ago. This awakening was due largely to the public addresses and writings of Professor Rothrock, and when the Legislature in 1893 was moved to authorize the appointment of a Forestry Commission to look into the subject of State forestry, Dr. Rothrock, though a Republican, was selected by the Democratic Governor Pattison as the head of that commission.

The State has made progress since then. The Forestry Commission made a most instructive and valuable report on the forests of the State. The commission of two gave place to a single Commissioner of Forestry, to which place Governor Hastings appointed the

one man in the State pre-eminently qualified for the position, Joseph T. Rothrock. The commission had collected information on forests and forestry. The Commissioner applied himself to the task of getting legislation under which forests might be protected and new growths of timber encouraged. As a result we have our fire-warden law, acts to encourage tree planting, the act providing for the creation of forest reservations at the headwaters of our chief rivers, the act providing for the purchase by the State of unsettled lands, sold for taxes, for the purpose of creating forestry reservations out of them.

Before Dr. Rothrock came to their rescue our forests had scarcely a single law on the statute book in their interest. Now Pennsylvania stands in the van of the States which manifest an intelligent concern for their forests and provide for their protection. We will have three large forest reservations as soon as the Legislature will appropriate the money to secure the land, and many smaller reservations through the purchase by the State of wild lands fit for forest growth. Our forests will be protected from burning by fire wardens, and partial relief from taxation will encourage farmers to plant trees.

A new and intelligent interest has been awakened in this State on the subject of forestry, and to no one man is this due so much as to Dr. Rothrock. He has been the soul and inspiration of the forestry movement in Pennsylvania—its intelligence and executive head. We are glad that Governor Stone recognizes this, and we embrace with pleasure this opportunity to commend him for a most excellent appointment.—*Phila. Press.*

Recently Governor Stone has made several appointments which merit the hearty commendation of his fellow citizens. The one, however, which has probably caused the most general satisfaction is the reappointment of Dr. Joseph T. Rothrock to the position of Commissioner of Forestry. All who

have the interest of forest culture at heart will feel particular gratification, because it insures for a term, at least, the continued advance of this important work in Pennsylvania. Dr. Rothrock is eminently fitted for the post of Commissioner of Forestry; in fact, there is probably not another available man in the State as well equipped for the work as he is. He has held the office since its creation, and he has done more than any one else to bring the State to a realizing sense of the importance of taking active steps for the preservation of the forest area which remains, and to interest agriculturists and others in the subject of tree planting and the desirability of planting more woodlands. In every respect he has filled his office worthily, and it would have been a severe blow to the forest interests of Pennsylvania if he had been removed.

Governor Stone, since his incumbency, has frequently made removals and appointments which have not met with popular approval. He has often shown too much partisan zeal in such matters and too great an inclination to listen to the voice of ex-Senator Quay rather than to that of the people. Dr. Rothrock, it is said, was marked for removal, to make room for some one having greater ability as a political worker. The report carried widespread dissatisfaction and protest, and it is gratifying to learn that it was without foundation, or, if his removal was in contemplation, that Governor Stone has listened to the voice of the people, and not to the demands of the factional politicians. It is much pleasanter to commend than to disapprove, and for once Governor Stone merits the hearty approval of the citizens of the whole State by his reappointment of Dr. Rothrock as Commissioner of Forestry.—*Phila. Ledger.*

So little has yet been done in this country toward the protection of our forests that any step in this direction, in whatever part of the United States, is cause for national satisfaction. Six years

ago some public-spirited citizens of Pennsylvania induced the Legislature to authorize the appointment of a Forestry Commission, and Governor Pattison, himself a Democrat, selected as its head Dr. Joseph T. Rothrock, a Republican, who was universally admitted to be the best man for the place. Two years later, when a single Commissioner of Forestry was given charge of the matter, Governor Hastings appointed Dr. Rothrock, with the approval of all good citizens. Under his leadership, acts have been passed by the Legislature for the creation of forest reservations at the headwaters of the State's chief rivers, and for the purchase by the State of unsettled lands sold for taxes, with a view to creating forest reservations out of them, while a body of fire wardens has been established to protect the forests from burning.

On every public ground, Dr. Rothrock deserved reappointment when his term expired. But, although a Republican in his opinions, he is no politician, and hungry office-seekers clamored for his place as a reward for their services to the party or the machine. There was fear that the Quay Governor would yield to these demands, but he has happily disappointed the public by commissioning Dr. Rothrock for another four years. The advocates of forest reform throughout the country will be encouraged by this evidence that the movement has already grown strong enough to command the respect of the politicians. — *Evening Post, N. Y. City.*

While there are many things in the administration of the affairs of the State to criticize, there are also some to commend. One of these is the reappointment this week of Prof. J. T. Rothrock to be Commissioner of Forestry. It was reported a few months ago that Professor Rothrock would be retired at the expiration of his present term, but Governor Stone has shown that he is not utterly devoid of sense in retaining in the

service of the State this most capable and popular servant.

As Commissioner of Forestry, Professor Rothrock has given the Commonwealth the benefit of his large experience and the enthusiasm which he brings to the consideration of the subject. He believes that there is no one thing more deserving the attention of the people than the restoration of the forests and those still left in the mountain region of Pennsylvania. He has been at the head of all these movements to promote tree culture, and through his efforts much good has resulted. The laws relating to forest protection and growth have been largely enacted through his personal efforts, and it would have been a lasting shame to remove him from a position of such great usefulness.

With the assurance of a certain tenure, Professor Rothrock can go ahead with those plans which have been under consideration in his department, and the whole State will applaud the Governor for once setting aside merely political considerations in making an appointment. — *City and State, Philadelphia.*

In the reappointment of Professor Rothrock as State Commissioner of Forestry Governor Stone certainly consulted the best interests of the Commonwealth, wisely casting political considerations to the winds.

In technical and practical knowledge of the subject of forestry Professor Rothrock is easily in the front ranks of his profession. During his eight years of service in his present position he has become thoroughly familiar with the needs of Pennsylvania in the matter of reforesting its denuded and barren acres, and is better qualified than any other man to make practical suggestions as to the best means of protecting the existing forest area of the State.

Professor Rothrock's reappointment is to be commended without qualification, and the State is to be congratulated upon the prospect of securing his efficient services for another term. — *Phila. Times.*

Sheep Grazing in Arizona.

A Paper on the Statement that the Forest Reserves are Injured by Grazing.

[THE FORESTER assumes no responsibility for views expressed in signed communications. The opposite view on this question will be published in the November issue.—Ed.]

The object of the American Forestry Association and of the Department of Forestry of the United States Government is to be attained, if at all, by candid, conservative and careful investigation of all the conditions of each locality and the establishment, for each locality, of such conservative regulations as the conditions, after such study, are found to require. There have been in the past many statements of a general nature, some of them coming from apparently high authority, that were based upon facts and conditions found in limited localities and applicable only to such localities. Such statements are extremely unfortunate, not only because they are unjust to local interests, but that they break the confidence of the settler of these localities in the Department of Forestry and bring into ridicule the whole plan of forest reservation among the settlers, on whom, in Arizona, at least, the preservation of the young forest most depends.

In the July FORESTER appeared an article on "Natural Reforestation in the Southwest," in which the author discussed sheep grazing in the forest reserves of "Central Arizona" from the standpoint, evidently, of facts and conditions found in California, and falls into the grievous errors above referred to. I do not wish to criticize the author, who, we feel, was the victim of misplaced confidence, with, possibly, too much theory on the science of Forestry, but justice to the high aims of the Department of Forestry, as well as to local interests, demand that the facts be known and that these errors be corrected before injustice be done. I quote from the article referred to:

"The topography of Southern California and Arizona is such that, at best, much of the rainfall flows off in imme-

diate floods," etc. After the statement in most positive terms of the necessity of excluding sheep from the forests of both California and Arizona, the writer adds, in justification of his position:

"As a specific instance in illustration of the destructive effect of grazing, the forest reserve in Central Arizona may be cited. Many of the streams which flow into the Salt River have their sources in these reservations. Whenever sheep have been driven there in large numbers, the farmers of the Salt River valley have suffered material injury from the canals and laterals filling with sand and silt." Then follows a paragraph on the same subject which is probably quite practical and true for the precipitous mountains of Southern California, but, if intended to apply to the forest reserves of Central Arizona, it is worthy the pen of a Cervantes.

There are three forest reserves in Arizona: the "Black Mesa," the "Grand Cañon," and the "San Francisco Mountain" Forest Reserve. The former lies on the east border of the Territory. The writer is personally familiar with very little of it, but understands the soil and conditions there are very similar to those of the other two reserves. As the waters of the "Grand Cañon" reserve all flow, when they flow at all, into the Colorado River, that reserve could not be referred to or affect this question. In fact, only a small per cent of the other two reserves lie on the southern slope. After a residence of eleven years at the foot of the San Francisco Mountains, and constant familiarity with all parts of the latter reserve, and with the grazing of both cattle and sheep thereon, we are forced to the conclusion that the author of the article referred to has been imposed upon by the parties from whom he derived his information.

The district composing this reserve, and the western end of the "Black Mesa" forest reserve as well, is a plateau comparatively level, averaging six to seven thousand feet above sea level, covered for the most part by an open forest of pine timber bounded on the borders, where the plateau descends into the deserts or timberless plains, with a belt, a few miles in width, of scrubby Cedar. On the south it breaks off abruptly into the tributaries of Salt River, the headwaters of which extend into this plateau in the form of precipitous cañons one thousand to fifteen hundred feet deep, which are fed by numberless springs that burst out at the bottom of these cañons.

The formation of this entire plateau is volcanic. It is covered with extinct volcanoes and evidences of volcanic influence. The stratified formation is everywhere broken and shattered, and the soil is of a loose, porous nature, so that the rains and melting snows are drunk up by the soil like a sponge and appear again, if at all, only at the bottom of the cañons, or small springs at rare intervals on the Mesa which disappear in a short distance from the point at which they rise. We have absolutely no running streams on this Mesa, or forest reserve. It is not precipitous and does not wash. To illustrate: The draw that passes through Flagstaff heads at the foot of Mt. Agassiz and topographically drains an area of more than two hundred square miles, has no outlet but empties into a little valley five miles east of town. It seldom runs to this valley and never more than once or twice during the year, and is often dry the entire year.

The forest reserve districts of Arizona have been used for grazing sheep for twenty to thirty years. We have never before heard it claimed that "The canals and laterals of Salt River valley filled with sand and silt" because of the sheep grazing on the forest reserves which lie two hundred miles further up the river; and one familiar with the mountain plateaus and with the dry, sandy, dusty, and windy districts and plains

through which the waters of the Salt River and the canals and laterals of the Salt River valley flow, after leaving the mountain forest reserves, would be hard to convince that the sheep on the mountain materially affected the filling of the canals and laterals referred to. If there were any such results, they would be constant, and it could not be said that "Whenever sheep have been driven there in large numbers," etc., these results were seen, because the ranges of these forest reserves have been used constantly for twenty years, and the results would be constant and universal in the Salt River valley.

There is little in common with the sheep-grazing industry of Arizona and that of many districts, perhaps any district of California. The scarcity of water on the mountain plateaus of Arizona has confined the summer ranges of each individual sheep breeder to a more or less definite locality during the summer and dry season, within which he owns or controls the permanent water supply. He is a settler. This is his home from which he comes and goes as the season may require. There is no undergrowth or "cover," and none is needed to "hold back the snow or prevent surface floods."

The great enemy to the forest and to the wool-growers is the forest fires which burn up the feed for the flocks and destroy the young and tender Pines. The grazing off of the grass and weeds by the sheep and the vigilance of the sheep owners are the greatest safeguards against these forest fires. Where the timber has been cut and the laps and brush left scattered upon the ground, these fires are inevitable, and destructive to much of the larger growth. Steps should be taken to require parties cutting timber to clean up carefully all combustible material left behind, whether on private or reserve lands.

It is the popular idea that sheep graze in close, compact herds and hence trample out what they do not feed off. This is incorrect. They are not closely herded or bunched except in driving or corralling, which, in well-managed herds, is

seldom done, and when scattered on the range the tramping of the small tree plants is slight.

There are in the San Francisco Mountain forest reservation districts on which sheep have been grazed constantly for twenty years or more, others on which cattle only have grazed, and a few districts on which neither have grazed at any time to any considerable extent, and we have yet to find the man who can go over these districts and point out which district has been grazed by sheep, which by cattle, or the district on which no stock has ranged. There is practically no difference in the growth of these districts. It is claimed by the oldest settlers that forest fires were more frequent

and destructive in the early settlement before the grazing by sheep and cattle, and that in the growth of the young Pine, the reforestation is greater where it has been protected by the stock and the owners of the stock. Systematic efforts on the part of both the Department and the herdsmen will bring much better results. Let us have an intelligent, candid investigation of this question in each locality by capable men who come seeking truth, and without preconceived notions and theories which they, consciously or unconsciously, seek always to sustain and prove.

(Signed)

E. S. GOSNEY,
Flagstaff, Arizona

Forest Conditions of Porto Rico.

Review of the Forest Resources of the Island, by the Special Agent of the U. S. Geological Survey, for Issue by the Department of Agriculture.

SECOND PAPER—FOREST ASPECTS OF THE ISLAND.

BY COURTESY OF THE SECRETARY OF AGRICULTURE.

Those who have read Kingsley's interesting description of the tropical forests of Trinidad, or Lafcadio Hearn's vivid pictures of the vast woods of Martinique, will be disappointed not to find such forests and woods duplicated in Porto Rico, except in the single instance of the summit portion of El Yunque, in the Sierra Luquillo, where there are about eight square miles of virgin forest. The island, although wooded in the sense that it is still dotted by many beautiful trees, is largely deforested from a commercial point of view. Porto Rico, at the time of its discovery, was undoubtedly completely covered by forests of many species of trees, but these can hardly be said to exist at present. A few insignificant patches of culled forest also occur in the central and northwestern portions of the island which will be described presently.

To the casual observer, the aspect of Porto Rico, in places, is still that of an open wooded landscape. The farms and

plantations, excepting the tobacco and sugar fields, are not cleanly cleared like those of the United States, but, on the contrary, individual trees are abundant and well distributed everywhere. Along the roadsides, around every hut, and throughout the coffee plantations are many trees, a few of which are remnants of the aboriginal forests, while most of them have been planted for shade or fruit. Orange trees, Mangoes, Aguacates, Breadfruit, Mameys, and other stately trees are common, while, as in our own deforested region, there are a few timber-making trees which have been spared the ax. Besides these larger trees, Flamboyantes, Nisperos and Guanabonas of smaller growth add their foliage to the wooded aspect of the island.

So far as was observed by reconnaissance methods the island presents two strongly marked and contrasting zones of vegetation. One includes the whole of the mountains and north coast region and the other is the foothill country

of the south coast. The first is a region of great and constant humidity, high altitudes and stiff clay soils; the other a region of dry calcareous soils, seasonal aridity and low altitude. The transition between these vegetal zones is very abrupt and immediately noticeable as soon as one passes from one of these regions to the other. It is true that the rainfall is less on the south coast and the country in general more arid, but there is also an immense difference in the capacity of the two geologic soils for retaining moisture and for root penetration, the clay soils being always saturated, while the limestones are porous and dry.

The climate of Porto Rico, although in general warm and humid, has a milder temperature and a greater constancy of moisture on the highlands than in the lowlands, while upon the latter there are occasional periods of drought. Accordingly, the mountains are constantly clad with fresh green verdure (consisting of such remnants of the primitive flora as have escaped the destruction of man) and cultivated trees, while the flora of the border region has at times a dry and yellow aspect.

The Mountain Woodlands.

The general growth of the mountain region consists of deciduous trees of many species, freely intermingled with shrub and grass, and above 1,000 feet with tree ferns. In some places the undergrowth is made up largely of ferns of numerous species, many of which are so tall and dense of growth as to constitute a veritable jungle.

Much of the mountain landscape is now occupied by cultivated crops of coffee, tobacco, fruit trees, shrubs, etc., broken by verdant pastures of tall Para and Guinea grass, which constitute the staple forage of the island. There are many large cultivated shrubs and bushes, attaining the size of a peach tree, which give an aspect of primeval wildness to one who first sees the country; hence, it is that some of these mountainous portions of the island which have the

aspect of thick primeval forests, when first viewed from a distance by the traveler from the temperate climes, are really the most highly cultivated.

Such wooded lands are often occupied by the coffee plantations. The coffee bush, which attains no great height, is always accompanied by an overgrowth of dense shade (the first essential to the life of the coffee bush), so that the latter has the appearance of an underbrush in the midst of high forest trees. The writer has often found it difficult to convince a fellow traveler that he was in a coffee plantation and not a jungle, until a tree could be found full of the bright red berries which distinguish the coffee plant. In fact, a Porto Rican coffee plantation, with its accompanying shade trees, is an artificial forest.

In preparing a coffee plantation, the native forest is either thinned of all except the highest trees or completely cleared of all growth and new trees planted for the express purpose of affording shade. These trees grow so rapidly that, by the time the coffee bush reaches maturity at the end of seven years, they are very tall forest trees, giving a dense shade above the bush.

The mountain trees are of many genera. They are largely hard woods, occurring singly or in varied associations, and not as collections of a single species, such as the Pine forests of the United States.

The Forest of El Yunque.

Single specimens or small groups of trees, however, which have been spared the woodman's ax, may be found throughout the upland portion of the island. In one place, however, the original forest has been preserved. This forest is upon the summit of El Yunque, the highest peak of the island, situated near the northeast end, and has been protected by its inaccessibility. Although the mountain is hardly over 3,200 feet in altitude, it is constantly bathed in moisture, and the steep trails to its summit through red clay and mud are almost impassable for man and beast. The forests on El Yunque consist of

almost impenetrable jungle of trees, underbrush and lianas, and are exceedingly wet, the rainfall averaging 120 inches per year. Some of the trees of the primeval forest of El Yunque have been described by Dr. George Eggers, the only botanist who has studied it, in a letter written to Sir Joseph Hooker in 1883, as published in "Nature" (London, 1884):

"As for the general character of the Sierra Yunque forests, they of course resemble in their main outlines those of the other West India Islands. Here I found several interesting trees, especially a beautiful *Talauma*, with immense white, odorous flowers and silvery leaves, which would be very ornamental. The wood is used for timber, and called Sabino. A *Hirtella*, with crimson flowers, I also found rather common. An unknown tree, with beautiful, orange-like foliage and large, purple flowers, split along one side; and several other as yet undetermined trees and shrubs are among the most remarkable things found.

One of the most conspicuous trees in some parts is the *Coccoloba macrophylla*, which I found on my first visit to Porto Rico. This tree is found up to an altitude of 2,000 feet, but chiefly near the coast, where it forms extensive woods in some places which, at the time of flowering, with immense purple spikes more than a yard long, are very striking. The tree is named Ortegon by the inhabitants. It does not seem to occur on any of the British islands, but to be confined to Porto Rico and Hayti."

Logs are still cut from the edge of the Yunque forest, but the cost in time and labor of securing timber therefrom is far more than it would be to import similar woods from Santo Domingo. A few acres of forest are also preserved here and there in the Sierra Cayey and the Cordillera Central, notably between Aibonito and Adjuntas. Collectively, these small patches will not aggregate ten square miles of standing timber, and have been largely culled of their most valuable trees. There is also a small patch of forest preserved in the pepino

hills, near Aguadilla, upon a small piece of land belonging to the Government. There may be a few more acres elsewhere. Otherwise, in a commercial sense, the mountains are deforested, although some excellent trees still stand, just as Walnut trees are found preserved in the deforested areas of the United States.

The Coast-Border Woodlands.

The second class of flora inhabits the foothills belt lying between the southern front of the Central Mountains and the southern coast, a region which is comparatively arid. The wide playa plains and stream valleys of this belt were also once covered with large trees, a few scattered examples of which have been preserved, but in general these have been destroyed in order to clear the land for sugar culture.

This flora is markedly different from that of the mountain region, although there are a few species of trees common to both regions. It is largely of the type of low, shrubby, thorny, leguminous, and acacia-like trees, with compound leaves and thorny trunks or stems covered by *Tillandsia* (Spanish moss), and largely of the type of growth known in the United States as the Chaparral. In the dry season this flora produces a brownish landscape, as distinguished from the evergreen of the mountain region. This Chaparral-like flora is thorny and dense, especially on the coast hills between Ponce and Yauco. In this region it is accompanied by a thick undergrowth of grass, and, with the rolling hills and "tepetate" soil, repeats nearly every aspect of the Lower Rio Grande country of Texas.

The limestone summits of the hills, or cerros, west of Yauco are covered by a remarkable growth of Chaparral, including Tree Cactus, among which are organ-pipe forms resembling those of the California deserts and the tree opuntias of Mexico, accompanied by thorny brush, the whole draped by moss.

The products of the forests and other vegetation of Porto Rico are numerous,

although of no great export value. They are of greatest importance to the inhabitants of the island, however.

The names of the woods here given are as they were written by the native Porto Ricans who assisted in their collection, and as they are spelled in the Commercial Directory of Porto Rico.

Among the products of the forest the following trees are used by man:

FOR TIMBER AND FUEL.—Algarrobo, Ausubo, Capa Blanca, Capa Prieta, Laurel Sabino, Laurel Blanca, Guayacan, Ucar (Ucare or Jucare), Espejuelo, Moca, Maricao, Mauricio, Ortegon, Tachuelo, Cedro, Cojoba, Aceitillo, Guaraguao, Maga, Yaiti, Palo Santo, Tortuguillo, Zerrezuela, Guayarote, Higuera, Tabanuco, Mora, Hueso, Hachuelo, "Ileucedran."

FOR CORDAGE.—Mahagua, a tall malvaceous bush.

FOR DYEING AND TANNING.—Moca, Brasilete, Achioté, Granadillo, Maricao, Dividivi, Mora, Gengibrillo, Camasey, Vijao, Mangle.

RESINOUS TREES.—Tabanuco, Pajuil, Algarrobo, Mamey, Masa, Cupey, Maria, Guayaco.

FOREST TREES YIELDING FRUITS.—Pina, Nispero (Medlar Tree), Mango, Guanabana, Cocotero, Aguacate, Naranja, Jacana, Mamey, Wild Orange.

The writer, during his stay upon the island, collected sixteen specimens of the native woods, which are utilized by the people in construction and other industries. Nine of these were found to be very hard, close grained and heavy. The samples of equal size and of approximately the same condition vary but little in weight and are remarkably similar in hardness. The following shows the comparative weight of the nine samples.

Mora, 61.8 pounds per cubic foot; Guayacan, 76.8 pounds per cubic foot; Hueso, 60.0 pounds per cubic foot; Ausubo, 70.2 pounds per cubic foot; Ucare Negro, 64.2 pounds per cubic foot; Pata de Caba, 60.0 pounds per cubic foot; Ucare Blanca, 61.8 pounds per cubic foot; Hachuelo, 70.2 pounds per cubic

foot; Algarrobo, 64.2 pounds per cubic foot.

Extreme density is shown by small pores (ducts) and in numerous, minute, mostly continuous medullary rays, imperceptible to the naked eye. The main structure is made up of thick-walled cells. The annual layers of growth are small and comparatively indistinct, owing to the irregular diffusion of the large ducts, which in most northern woods clearly mark the layers of growth. The wood fibers are strongly interlaced (cross-grained), giving a "tough," uncleavable character to the wood. The samples of Mora, Guayacan, Hueso and Ucare Blanca show a tendency to check and warp in seasoning, while Ausubo, Ucare Negro, Pata de Caba, Hachuelo, and Algarrobo appear to maintain good form in drying out. The injury from checking of the former is, however, not great, and appears not to impair the usefulness of these woods for certain purposes. All are capable of receiving a high polish and require but little "filling."

Ausubo, Ucare Negro, Pata de Caba, Hachuelo and Algarrobo are eminently cabinet woods of great value and attractiveness; Mora and Ucare Blanca are less attractive for this purpose, but may have limited use. Guayacan and Ausubo are especially adapted for small turnery, tool handles, etc., where great hardness and wearing qualities are needed. Pata de Caba and Algarrobo closely resemble the rosewoods of commerce. With a permanent black stain, Ucare Negro and Hachuelo are useful substitutes for Ebony. Ausubo is similar in appearance and a good substitute for the valuable "Coccobola" (Coccoloba), so much imitated by inferior woods. Laurel Sabino, Cedro, Capa Blanca, Capa Prieta, Guaraguao and Maga are characteristically lighter, softer and coarser grained than the nine species above mentioned. The weight of these samples varies but little, the average being 38 pounds per cubic foot. With the exception of Laurel Sabino, all are attractive in grain and suitable for finishing woods.

The following descriptions give, in part, the specific characters of the various samples:

MORA.—Color, bright orange-brown, probably darkening with age and exposure. Radially cut and polished surface satiny. Similar in general appearance to Osage Orange. Much used for fellies.

GUAYACAN.—Heartwood dull yellowish-brown, with dark olive-brown streaks; sapwood pale yellow, with brownish areas. Smoothed surface, oily to the touch. Exceedingly hard, brittle and difficult to cut. It grows in comparative abundance in the entire mountain chain and on the southern coast of the island, producing a wood which is very solid and resistant. On this account it is much sought after in the shipyards for blocks, pulleys, spokes, tires, and many other things requiring great strength. The resin from the Guayacan *Lignum Vitæ* is highly valued for gout.

LAUREL SABINO.—Color, clear olive-brown. A straight-grained wood, similar in color but finer grained than the heart of Tulip and Cucumber tree of the United States.

CEDRO.—Color, pale reddish-brown. Wood fibers interlaced, the wood splitting irregularly. Very similar to the Mahogany of commerce. Probably *Cedrela odorata*, the well-known cigar-box wood of commerce. It is no longer abundant in Porto Rico, and is now largely imported from Santo Domingo, costing \$150 per 1,000 feet. It still grows in Aguadilla and near Aibonito, Juana Diaz, Cayey and Luquillo.

HUESO.—Color, light yellow, with irregular, thin yellow-brown streaks; wood fibers strongly interlaced. A tough, uncleavable wood, used for hubs.

AUSUBO.—Color, clear, dull, reddish-brown. Wood fibers slightly interlaced and appearing straight grained. Resembles somewhat a fine-grained Teak. It is the chief and most-used timber on the island, being noted for its great durability. It is used in the making of wagon spokes, which are turned out by machinery in Ponce, and small stocks of it were noticed in several towns. It is

close grained and beautiful in color, and should be utilized for veneering; it would make most excellent furniture.

UCARE NEGRO.—Color, dark umber-brown. Wood fibers interlaced, but appearing to be straight grained. Remotely resembles a very fine-grained Black Walnut.

PATA DE CABA and ALGARROBO.—These samples are so similar in details of structure as to be from the same or closely related species. Color, rich, blackish-brown, irregularly mottled, and streaked with areas of pale reddish-brown; sapwood (present in Pata de Caba) light brown. Wood fibers strongly interlaced, giving smoothed surface a "curled" appearance. Very attractive cabinet woods.

UCARA BLANCA.—Color, light ashy-brown. Wood fibers strongly interlaced. Remotely resembling fine-grained heartwood of American Elm.

GUARAGUAO.—Light reddish-brown, streaked with lighter and darker shades. An exceedingly cross-grained, porous wood, somewhat similar in color to Cedro. Suitable for a cabinet wood.

CAPA BLANCA.—Color, clear light-brown. Structurally similar on the radial section to American Beech. Straight grained, and suitable for interior finish. Used for rollers in coffee hulling mills.

CAPA PRIETA.—Color, rich light-brown, with darker streaks and mottlings. Wood fibers interlaced, but wood appearing to be straight grained. Radial section structurally similar to Capa Blanca. Tangential section somewhat similar to dark heartwood of American Elm. Handsome wood for interior finish. Used for flooring.

HACHUELO.—Color, rich, dark yellowish-brown, with streaks and mottlings of light yellow-brown. Wood fibers interlaced, but appearing rather straight grained on the finished surface. Valuable for cabinet work.

MAGA.—Color, rich chocolate-brown. Wood fibers slightly cross grained, the smoothed surface appearing straight grained. The rich color and attractive grain of this wood should make it valuable for cabinet work.

Irrigation and Forestry.

The Joint Meeting in Montana—Resolutions Adopted at Columbus.

The eighth Congress of the National Irrigation Association was held at Missoula, Montana, September 25, 26 and 27. On invitation, The American Forestry Association joined in the meetings through the presence of its many members.

The close relations between forestry and irrigation made the meetings of value to those more especially interested in the former subject, though the papers and discussions aimed primarily at a more general understanding and appreciation of the latter. The scope of this work, as described at the Congress by G. E. Mitchell, of Washington, D. C., is:

"The proper presentation of the problem of satisfactorily disposing of the grazing lands by the leasing system and the securing of a just and equitable share of improvement appropriations for the development and improvement of interior States along with the seaboard States."

More than two hundred duly accredited delegates, from seventeen States and Territories, were present at the sessions. All the Western States were represented, and among the more distant States were Maryland, West Virginia, South Carolina and Indiana. Among the representatives from Government Departments in the District of Columbia were F. H. Newell, Corresponding Secretary of the American Forestry Association, and Bailey Willis, U. S. Geological Survey; J. W. Toumey and Milton Whitney, U. S. Department of Agriculture; Judge Best and Walter H. Graves, U. S. Department of the Interior; and E. J. Glass, U. S. Weather Bureau.

Nearly a score of papers were read by men prominently identified with the irrigation interests and general development of arid lands in the West. The congress was the most successful one held in four years.

(Further report in next issue.)

At the special meeting at Columbus, Ohio, August 22 and 23, an account of which appeared in the September issue of *THE FORESTER*, the resolutions presented and adopted in the name of The American Forestry Association declared in favor of—

1. The creation of an international commission, through M. Meline, of Paris, to arrange for a Congress of Forestry at the Paris Exposition of 1900.

2. The purchase and reservation, by the State of Ohio, of tracts of timber land at the headwaters of the principal rivers of the State in order to prevent the increasing loss of life and property by flood, and for the better preservation of a water supply in time of drought.

3. The establishment of colleges and schools of forestry in the various States, with as much assistance as possible, in encouragement of the work, from the Department of Agriculture.

4. Commending the policy adopted by the State of Pennsylvania in the appointment of an expert forester to organize and conduct the forest interests of the State, and to educate its citizens in practical forestry.

5. Urging the suitable presentation of the subject of forestry at the meetings of teachers' associations, farmers' institutes, and other similar gatherings, "to the end that the people may be taught to give earnest attention to this much-neglected, but vitally important interest."

6. Extending the thanks of the Association to the Columbus Horticultural Society for the arrangements made for the special meeting, and in recognition of the work being accomplished by the Society.

The report was signed by W. J. Beal, vice president of the association for Michigan; C. E. Bessey, vice president for Nebraska; and William R. Lazenby, professor of forestry at Ohio State University.

Forest Protection.

Fires in Nehasane Park.

The extreme drought in the Adirondacks during the past summer has been almost unprecedented. For months practically no rain fell and the surface of the ground in the dense forest, which usually contains a considerable amount of moisture, became thoroughly dry. Even the moss in many of the swamps, usually saturated with water, was so dry as to be readily burned by fire. In consequence numerous fires were started in all parts of the woods, and the methods of forest protection employed by the State and private owners were put to a severe test. Probably no more complete organization for forest protection is found in the Adirondacks than in Nehasane Park, the property of Dr. W. S. Webb, in Herkimer and Hamilton counties, New York. The park is primarily a game preserve and the system of protection was devised by Dr. Webb to prevent poaching as well as to guard against forest fires.

The park, which covers an area of about 40,000 acres, is divided into four sections, each watched over by an experienced woodsman, who lives at a point from which all parts of his section can be easily and quickly reached. The houses of the rangers are connected by telephone and there is an admirable system of roads and trails. In case of fire in the park, the superintendent, who lives at Nehasane station, and the rangers are notified by telephone, and all available men are called out to extinguish it. If it occurs along the railroad which traverses the park, the "Nehasane Fire Service" is put into use. This consists of a large tank placed on a flat car to which is attached a box freight car, containing a small engine, used to pump the water from the tank, and a complete outfit of fire hose, axes and other articles used in fighting fire. In case of a severe fire along the railroad Dr. Webb is notified by telegraph and a locomotive is

dispatched to draw the "Fire Service" to the scene.

During the past season extra men were employed to follow each train on speeders and to extinguish any fires which were set. Some days as many as five fires were started by the locomotives and immediately extinguished. In several cases, however, the "Fire Service" had to be called into play, and with its aid the fires, which might have proved very disastrous, were put out.

One very severe fire was started in September and burned over about four acres before it could be controlled. The workmen from the lumber camps on the park were called to assist and at one time as many as 100 men were fighting the fire. Trenches were dug completely about it, streams of water were thrown by the "Fire Service," and sand was brought from the railroad track.

A constant watch was kept on the fire after it was once controlled. This measure was very necessary, for the fire continued to smoulder in the deep duff and every now and then burst forth anew. Trees were undermined and, as they toppled over, scattered sparks in all directions. Occasionally the fire would run up a Birch tree and pieces of burning bark would be blown over the trenches upon the dry leaves. If constant vigilance had not been exercised in the manner described a considerable area would doubtless have suffered.

A Bit of Historical Information.

The awakening interest of lumbermen in forest protection is shown by the following excerpt from a letter to the Division of Forestry from a prominent lumber firm in Michigan, regarding the abuse, rather than the use, of the forest wealth of that section.

That lumbermen themselves speak in this vein is sufficient evidence that the facts are exactly as stated, and that no one can offer in rebuttal any argument

on the score of "sentimental reasons," or "theorizing opinions" of "misinformed enthusiasts"—terms which are sometimes applied to those who favor forest conservation as opposed to forest destruction. The letter reads:

"Answering your circular letter of July 5, 1899, upon subject of protection of forest, we beg to say that positively no effort to do this, other than to save valuable standing timber when aflame or threatened, has ever been made in this vicinity. To protect trees too young and small for sawing is not thought of. Owners of timber simply go on their lands and as quickly as possible remove timber fit for lumber, with positively no thought or care for the life and protection of the young trees, or varieties not at the time valuable for lumber, leaving debris to dry and finally burn, resulting in the total destruction of all remaining.

"Large areas are now simply scenes of desolation. Waste—pure, simple and shameful—has characterized the removal of the forests once here, which were magnificent. Many varieties, notably Hemlock, Beech, Soft Elm, were left to burn, or were destroyed in clearing lands. We think it is within the truth to say that not over 50 per cent of the possible quantity available for man's use has been utilized—the remainder has perished. 'Tis true that the demand for the cream only, largely accounts for the waste; still, splendid interest on the cost of protecting, years ago, the timber not then valuable, would now be realized, as is instanced by the fact that despised Soft Elm, the very best of which was bringing only \$3.00 per M in log, is now sought for at from \$9.00 to \$11.00, and the lumber is in demand at \$18.00 to \$28.00, shipping point. Beech would not then be accepted at any price in logs. The lumber now fetches \$10.00 to \$15.00. The destruction of Michigan forests is relieved from the charge of act of vandalism only by the fact that the owners did it, and, under the law, could do as they wished with their own; but their action has deprived posterity of a fine heritage."

The Kind of Trees to Plant.

The example set by Kansas City in improving its streets by the construction of parallel parkways in which to plant shade trees on scientific principles, has been followed by other towns through Missouri and adjoining States. In reply to inquiries, the City Forester of Kansas City, L. F. Timming, gives the following observations on his experiments:

"The tree which ranks first in my estimation as a shade and ornamental tree is the Hard Maple, of which there are two varieties; namely, the Sugar Maple and the Black Maple, but on account of their slow growth I prefer to alternate them during the first ten years with some faster-growing variety, for example, the Soft Maple. Of the Soft Maple we also have two varieties, namely the Red Scarlet Maple and the White or Silver Maple, of which the former is less liable to become affected by insects than the latter. As an all-round shade tree for our city I know of none better than the Soft Maple, but it requires some training while young in order to keep the head in proper balance with the trunk. If once well developed it will stand high winds about as well as the average tree, but it is liable to be attacked by the treesoc moth, but not to any great extent

"The Sycamore tree has also two varieties, the Oriental and the Sycamore Maple. The Oriental Plane tree is the better, and is an imported variety. The Sycamore Maple is our common native Sycamore, and it belongs to the Maple family, and is therefore subject to the same natural requirements as the Soft Maple. It is a rapid grower and does not break as easily as the Soft Maple, and is not so liable to be attacked by insects as the Soft Maple or the Elm. It bears transplanting and trimming remarkably well. Its drawback is that it grows too large for an ordinary street tree, and as it becomes full grown the bareness of its branches and the constant shedding of its leaves during the summer are its principal objections. Deep soil is preferable, but not an essential."

Municipal Care of Trees.

The Department of Forestry of the City of Springfield, Mass., has shown commendable energy in the protection of trees along streets in that city. The City Forester, William F. Gale, has lately issued a circular letter saying:

"The cutting of roots of trees being one of the most common injuries to which shade trees are subject, the Supervisors of Highways and Bridges, at the request of the City Forester, have instructed the employees of the city having the laying of walks and the setting of curbsings,

not to cut the roots of trees without his consent.

"The attention of contractors, excavators, builders, and all others having to do with the laying of walks and grading, is called to the order of the Supervisors, and they are requested to instruct their men that the cutting of roots of trees within the highway is *not allowed*, except as provided above. Section 7 of Chapter 54, Public Statutes of this State, which forbids the mutilation of trees, applies to their roots as much as to any other portion of the tree."

Forest Fires of a Month.

Extensive forest fires throughout the Adirondacks were not only the cause of some property loss, but of much uneasiness to summer residents and campers. However, Col. William F. Fox, superintendent of State forests, in an interview concerning the fires, declared that the reports were exaggerated.

He said the fires were alarming in appearance, and made much smoke, but that with few exceptions no merchantable timber was destroyed, as the fires in almost every instance stopped when they reached a piece of thick woods. The most damage to timber was done by the fire on top of Black Mountain, Schroon Lake, Fulton Chain. The Tupper Lake fire threatened the lands of the Cornell College of Forestry at Axton, in Franklin County.

The college professors, with a large body of students, fought this fire and kept it out of the college forest. They were assisted further by some engineers of the State engineer's office, who were busy surveying the lines of the college tract. All the lumber and wood pulp companies put men at work to save their own woods. There were 281 fire wardens at work, who receive \$2 a day, one-half of which is paid by the town in which the fire wardens are put to work. The expense of paying for this work, so far as the State is concerned, will be taken out of the \$350,000 appropriated this year to buy forest lands.

In New England, the forest fires in South Harwich and South Chatham continued with unabated energy. One section of fire, which threatened to sweep through the entire village of South Chatham, was checked by backfires and trenching just in time to save the village from a general conflagration. The fire wardens and their gangs of men came from all directions and fought the flames.

After having been beaten back, the fire soon started again in two new forks, one toward the

western section of South Harwich and the other toward the eastern section of Chatham, the former having crossed the railroad track. Everything was as dry as tinder, there having been no rain for about two months.

In Arkansas disastrous fires were reported in the southern portion of Calhoun County, the only hope of relief being a heavy rainfall. Fire fighters worked day and night, several being prostrated by the heat while at work.

A large area in the Ouachita Valley was devastated, and large herds of stock were driven from their pasturage. Considerable property of stove-makers in the woods was destroyed.

A great fire was reported in the early part of September in the Sierra Madre Mountains, southeast of Old Baldy, in Southern California. The fire started in Stoddard's Canyon, the press reports estimating that at least 40,000 acres were burned over, some of the trees being from four to six feet in diameter and nearly 200 feet high.

Forest Superintendent B. F. Allen issued a statement denying these claims, and placing the area at 3,000 acres, entirely of brush.

Big Timber, Mont., September 26.—A raging forest fire is in progress west of this town, on the east side of the Crazy Mountains. It is likely that disastrous results will follow to some of the ranchers in the Norwegian settlement, toward which the fire is rapidly approaching. The fire is between the east fork of the Big Timber Creek and Antelope Creek, and will in all probability destroy an area of sixty square miles of fine timber before it burns out. The flames are plainly visible from this town, twenty-five miles distant. The whole east side of the Crazy range is brilliantly illuminated and presents an awe-inspiring spectacle.

The Prevention of Forest Fires.

Three Chapters on a Question of Importance.

A Letter.

To the Editor of THE FORESTER: I enclose an article published in the *Oakland Enquirer* a short time ago. You will see that, in the absence of expert knowledge, this article does not venture upon positive assertions, but puts the view of the matter taken by the old mountaineers as a plausible hypothesis. I would like to be informed, either through THE FORESTER or in some other way, whether the government bureau has ever considered this aspect of the forest problem in California and, if so, what arguments it relies on to refute the mountaineers.

Scientific authority is the best in these matters, we all know, and yet the practical experience of old-time residents of the forest regions cannot be despised, and unless these old-timers are seriously mistaken in their premises, the Government is incurring a serious risk in the Yosemite National Park and in the forest reserves, by excluding all fires, instead of letting fires run through the forests periodically, thereby destroying the undergrowth and, more particularly, the accumulation of dead trees, leaves and branches.

A Clipping.

Aside from the stockmen who would be glad to browse their flocks and herds upon the national domain, every one in the forest regions of California indorses the policy of maintaining national parks and forest reserves. But it is hard to find in the region of the California reserves a single settler or landowner who believes that the present plan of forest protection will bring forth good results in the long run.

The great point of difference is the extinguishment of forest fires. During the summer the efforts of the Government foresters are devoted to preventing fires and to extinguishing them when they do occur, the object being, of

course, the praiseworthy one of saving the forests from destruction. But in the judgment of the settlers, while this seems wise for the time being, the ultimate effects are likely to be bad, for the reason that there will be such a growth of underbrush and such an accumulation of forest debris that sooner or later there will come fires with which no human exertion can cope. And then the forests will go up in one mighty blaze.

In the view of the settlers, California, with its rainless summers, calls for a different method of forest preservation from that which would be judicious in more moist climates. They say that the true method is to burn over the forests every summer, whereby the fires would be made so light that the trees would suffer no injury, and great fires capable of destroying a whole forest will be prevented. This is exactly what the Indians used to do, the settlers argue, and wholesale destruction of forests in their time was unknown. So firmly rooted is this conviction among settlers and forest owners in the Sierra region of California that on some occasions private owners have refused assistance to put out fires on timber lands owned by them, because they wanted them burned over as a measure of safety.

The idea that the Indians were better foresters than the scientific experts of the present day seems a peculiar one, but it is seriously maintained by many intelligent people.—*Editorial, Oakland Enquirer.*

A Comment.

(By the Superintendent of Working Plans, Division of Forestry.)

California is not the only State in which the annual burning of the forest is considered among the residents the best method of protecting the timber from heavy fires. In certain sections of the East, notably in the Atlantic Pine belt,

many owners of timberland make it a practice to burn over their land every spring soon after the snow melts and before the surface of the ground has become so dry that light fires cannot be kept under control. The object of this annual burning is to destroy the layer of leaves, twigs, etc., which has accumulated on the ground during the previous year. If the work is done soon after the snow melts, the ground is somewhat moist so that the fire burns slowly and can be kept under perfect control. The season of growth has not fairly started at this time and the fire is less liable to injure the timber than if the burning were done after the sap had begun to run.

Most land owners who treat their forests in this manner burn the entire area, merely with the view of protecting the standing timber. In this they are successful, but at the same time a large amount of young growth is destroyed. If the owner of an open Pine forest wishes merely to save the standing timber without regard to the future value of the land, no better plan can be recommended than to burn the area every year in the manner just described. The ultimate effect on the forest is, however, disastrous.

The effect of repeated fires on the productive power of forest land was studied in Southern New Jersey in 1897 by Gifford Pinchot, the results of whose investigations have been published by the New Jersey Geological Survey. In this report it is shown that repeated fires, combined with steady cutting of merchantable timber, reduce the forest so completely that the land is practically worthless. Many figures are given to show that burned areas in New Jersey are producing not more than one-sixth of the amount of wood they might have yielded, and that the quality of the product is vastly inferior to what would have grown on unburned land. It is shown also that even this small amount of timber would not have grown were it not for the marvelous power of the Pitch Pine to resist fire and to sprout after the trees were killed back.

Careful observers in the Sierras report that there were formerly many open parks and meadows which, since the occupancy of the country by the whites, have been covered with forest trees. Knowing as we do that in former times the Indians burned the forest regularly, the inference must be drawn that these openings were caused by fire; in other words, that the forest was gradually becoming less dense in burned sections and, on the edge of the timber belt, was probably gradually retreating from the prairies. It is obvious that if the young growth is constantly destroyed by fire, there will be no trees to replace the old specimens which die or are cut down.

In advocating the annual burning of the California forests the mountaineers are considering only the protection of the standing timber and are ignoring the future production for coming generations. A private owner may be justified in pursuing such a policy, but the Government or State must make provision for the future as well as for the present. A measure which destroys the foundation of the future forests must not be thought of for a moment on Federal lands, and some different method of protecting the forest from fire must be devised.

The mountaineers are entirely right in stating that the material, which accumulates on the ground where the land is not burned, makes a very hot fire, and that the danger would be lessened if there were areas where there is no inflammable material. No intelligent man would, however, advocate indiscriminate burning without a force of men to control the fire.

If burning were resorted to at all as a protection against heavy fires, it should be confined to areas where there is no valuable young growth; but our belief is that it would be possible to organize a system of forest police which would be effective in protecting the standing timber as well as the young growth.

H. S. GRAVES,
Washington, D. C.

THE FORESTER.

A MONTHLY MAGAZINE

Devoted to Arboriculture and Forestry, the
Care and Use of Forests and Forest
Trees, and Related Subjects.

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FORESTER.

The mission of THE FORESTER has been, and will be, to advance the interests of scientific forestry and related subjects in every practicable way. One of these ways, and an important one, it believes, is to afford through its pages ample opportunity for an intelligent discussion of the problems involved, though not accepting responsibility for the views expressed by others. Even fair-minded men may oppose when they do not know the whole truth; but when opportunity is given for learning the facts, THE FORESTER will have confidence in the decision of its readers.

"Prompt action" is the watchword of the Minnesota National Park and Forestry Association, to secure the reservation of valuable lands in the northern part of that State as "a park for the people." And with such experienced leaders and successful business men in charge of the project, there is the hope of great things resulting from the present trip of Congressmen and public-spirited citizens to inspect the country.

The general approval of the plan could not be evidenced more clearly than by the thorough agreement of the daily press and the lumber journals on the point of the advisability of the new reserve. Of the articles included in the symposium in this issue, the first is taken from the St. Louis *Lumberman* and the second from

the Chicago *Record*, while the third expresses the views of the Chicago *Inter-Ocean*.

For the diffusion of general and particular knowledge regarding the achievements of the United States in every branch of science relating to agriculture, including forestry, during the nineteenth century, the 1899 year-book of the Department of Agriculture will be extremely valuable. One of the first thoughts in arranging the scope of the coming volume has been its distribution at the Paris Exposition.

The Division of Forestry will contribute a short history of forestry in the United States, and also an account of the efforts of private land-owners to apply the principles of forestry. More has been done in this direction than is generally supposed. The owners of woodlands in many instances have handled their wood crops with prudence, and have shown the desire and the ability to preserve the forest without ceasing to use it, and farmers in the treeless districts have improved the agricultural resources of their lands by tree planting.

Where private owners have utilized merchantable timber without injuring its productive power, and to establish new forests, there has been the intention and idea of true forestry. In the Spruce lands of the Northwest small trees have been left standing, so that a second crop is assured. In New England White Pine has been planted in waste places with encouraging results, and the same can be said of Larch in Massachusetts. In the treeless States of the West, the Osage Orange, the Catalpa, Maple, Elm, Box Elder, Scotch Pine and Norway Spruce have acted splendidly as windbreaks, and along the banks of the streams the planting of trees has done good service in fixing eroding soil, preventing the increase of floods, checking excessive surface drainage, arresting the formation of gullies, and otherwise conserving the fertility of the soil.

It is desired to secure from the public at large such information as will be pertinent to a complete review of the forest interests of the United States. Any one who has practiced forestry, on whatever scale, will be supplied with full information by communicating with the Division of Forestry.

The press of news matter has necessitated the insertion of several additional pages in this issue, and the withholding of two valuable papers intended for this issue, which will appear next month.

CHIPS AND CLIPS.

The importation of wood pulp into Italy is greatly on the increase.

A Vancouver timber merchant has just made the first importation of Australian hardwood into British Columbia.

John Crowe, a forest ranger in the Rat Portage District of Ontario, was recently drowned in the Mimikon River in that province.

One and one-quarter million square miles is the estimate of the timber area of Canada, as given by the U. S. consul general at Montreal.

One of the most valuable timber trees in the great Northwest, the Red Cedar, grows to a maximum height of 300 feet and a diameter of 14 feet.

Norway supplied Great Britain with twice as much ground wood pulp last year as the United States, Canada, Sweden and Holland combined.

Immense Spruce forests will be opened to commercial development by the extension of the Atlantic & Lake Superior Railway to Gaspe Basin, Quebec.

Paper shingles have been introduced into Japan by an enterprising Tokyo firm as substitutes for the wooden article. The new idea is a slab of thick-tarred pasteboard, more easily managed than ordinary shingles and costing only half as much.

Some historical trees have lately come into the New York lumber market from the Wilderness battlefield of the Civil War. The bills of lading showed that the trees had been felled and the lumber sawed there. In some of the planks the minie balls can be seen plainly, the wood directly adjacent to the bullets being discolored or rotten, but not enough to damage the lumber.

While the display of forest products which Canada will send to the Paris Exposition of 1900 will include everything from the tree to the semi-finished product, it is the intention of the special commissioner to give attention also to recent exports of wood manufactures.

A bureau of forestry has been established in connection with the Canadian Department of Interior, and has been placed in charge of Elihu Stewart, former mayor of Collingwood, a Dominion land surveyor, who has made a special study of the various woods of that section during the past twenty years, and has often acted as arbitrator in forest matters.

The possibilities of a lucrative export trade in Tamarack between Canada and Great Britain received something of a setback in this reply from the Imperial Institute of London in answer to inquiries from the Dominion: "Gum of any kind is practically unknown in England, gum-chewers being confined to Canada and the United States." But there is said to be a good demand for tamarack for medicinal purposes, so that some samples will go abroad at any rate.

The portion of the State of Washington west of the summit of the Cascade range is covered with the heaviest continuous belt of forest growth in the United States. This forest extends over the slopes of the Cascade and Coast ranges, and occupies the entire drift plain surrounding the waters of Puget Sound. Excepting the highest mountain peaks and the sand dunes of the coast, which are treeless, the valleys of the Cowlitz and Chehalis Rivers, which are dotted with small Oaks and other deciduous trees, and the stunted Yellow Pines occupying with open growth the barren Steilacoom plain, all of western Washington is covered with a magnificent forest.

The Almighty Dollar.

The need of eternal vigilance in protecting the forest reserves of the National Government is emphasized by the conduct of certain logging and milling companies in Western Washington. When the reserves were set apart under the Cleveland Administration, it was provided that the owners of timber lands within the limits could deed them to the Government and receive in return an equal acreage of good standing timber elsewhere. Officials who have been investigating the matter find that the companies have practically denuded the land, which they now wish to exchange for well-wooded tracts. As there was nothing said in the law about cutting off the growth before the transfer, it appears that the lumbermen have succeeded in

their sharp practice as far as they have gone. The prevention of further despoilment is the least the Government can do.—*Buffalo (N. Y.) Express*.

In Enlightened Africa.

The Congo Free State has issued a decree intended to prevent the extinction of the india-rubber tree in that country. The law provides that not less than 150 trees shall be planted for every ton of rubber yielded annually. The gathering of rubber, except through incisions in the bark, has been prohibited for some time past, but the law has not been strictly enforced. Hereafter violations will be subject to the infliction of a fine not exceeding \$2,000, or by a term of imprisonment.

Recent Publications.

For more than a year the Division of Forestry has been engaged in giving practical advice and assistance to private owners in conservative methods of handling their woodlands. An account of the first important work along this line is about to be published in Bulletin No. 26, entitled "Practical Forestry in the Adirondacks," by Henry S. Graves. The publication is important as containing a description of the first successful attempt at systematic forest management on a large scale in the Adirondacks. The work described consisted in the preparation and the actual carrying out of a forest working-plan in Nehasane Park, of 40,000 acres in Hamilton and Herkimer counties, New York, owned by Dr. W. Seward Webb, and on an adjoining tract of 68,000 acres, owned by Hon. William C. Whitney.

Mr. Graves discusses at length the problem of Forestry in the Adirondacks, and shows what lines of work are practicable at the present time on the above mentioned tracts, as well as what could be done in the way of Forestry by the State of New York, were the cutting of timber on State land not prohibited.

In considering the problem of forest management by the State, Mr. Graves says: "The chief purpose of the State in maintaining large preserves is to protect the important water-

sheds and to provide a future supply of timber. The revenue which could be derived from the sale of lumber is a secondary consideration. The State can go further than the individual in the direction of systematic forestry, for it can afford to make investments with the expectation of but small profits, or it can wait many years before realizing anything at all. Moreover it may be satisfied with indirect returns in the general benefit to the community. The New York State holdings in the Adirondacks now exceed 1,000,000 acres, and are being increased as fast as appropriations can be obtained for the purpose.

"At present the constitution of New York prohibits the cutting of timber on State land, so that its management consists only in protecting the forest from fire and theft. But undoubtedly the constitution will in time be changed so as to permit conservative lumbering on the State preserve. Were this possible, the system of management which would be practical at the present time would necessarily be very simple, and would not differ to any great degree from that which can now be used by lumbermen and other private owners. The general plan for cutting Spruce should be the same as that presented in the working plan given in this report, namely, to remove the old timber above a certain diameter and, where necessary, to leave selected trees above this size for seed. In this working-plan ten inches at three feet from the ground has been made the average minimum limit for cutting. The State of New York, however, could afford to

leave all trees under twelve, and if necessary, all under fourteen inches in diameter; in other words, to leave a larger amount of money invested in the forest than the private owner.

"The State of New York could further carry on thinnings, for the improvement of the trees left standing, rather than profit from the sale of the timber. Thus the removal of many one-log Spruce trees, six to ten inches in diameter, which are usually left standing by the lumbermen, would benefit the forest to a considerable extent by giving more growing space and light to the trees which remain. In the same way small trees, which could be used for pulp, could stand in dense thickets, and a thinning of one-fifth or more of the crop would enable the remainder to grow much more rapidly. If a contractor were obliged to cut these trees he would undoubtedly raise his contract price. The State of New York could pay this price for the benefit of the forest. But at present most private individuals could not afford to make such an investment. Under certain circumstances the State could probably girdle some of the large, crooked hardwoods which are crowding small Spruces and Pines, or if necessary, cut them down; but for a lumberman in the Adirondacks such work would not be profitable at the present time.

"The State would have a special advantage over the private owner in being able to enforce stricter regulations on the contractors in regard to the careful construction of roads, sparing the small growth in felling timber, in building skidways, bridges, etc., and lopping the branches from the tops as a protection against fire. The lumberman can carry out these regulations only so far as they do not to any great extent affect the cost of logging. Moreover, the State could employ a much larger force of experts to superintend the marking of timber and to watch the work of the contractors, or, in other words, could take better care of the forest than the private individual."

Referring to the private owner the author says: "The only reason for lumbermen and most private owners to adopt forestry is the financial one. Private individuals and clubs to whom the income from the forest is less important than its preservation are in the same position as the State. But lumbermen have invested their money in forest land or stumpage as a business matter, and, unless the ultimate returns are greater from forest management than from the ordinary methods of lumbering, they cannot be expected to consider it at all. * * * Hitherto many lumbermen, who have looked up the matter of forestry, have not adopted it because they have been unable to make a compromise with the foresters. Either they have wished to strip the land, or the foresters have insisted upon certain measures which the lumbermen could not afford.

"Every plan of forest management in this country must be in a measure a compromise

between the owner of the forest and the forester. The former must consent to leave a certain amount of capital invested in the forest in the form of growing wood, and obtain his returns from merchantable timber after the necessary period of growth has passed, or from the increased value of the land. The forester, in turn, must give up certain operations which would benefit the forest."

And again: "The object of the forester is to obtain for the owner a large revenue from the timber, but at the same time to leave the forest in a condition to produce a second crop in a comparatively short time, and to reseed the openings made in lumbering with young growth of valuable species."

The general plan for cutting Spruce, as recommended in the working plan and as actually carried out on the two preserves under consideration, was to remove all trees ten inches and over in diameter, with the exception of such specimens as should be needed for seed. The plan of work advocated was accepted by the lumbermen, and during the first year, fifteen lumber camps were operated and 9,783 acres were lumbered for Spruce and Pine.

The publication contains a detailed description of the forest on the two tracts under consideration and a study of the habit, growth and production of the Spruce. Mr. Graves has drawn freely from the material contained in the "Adirondack Spruce," by Gifford Pinchot, quoting a certain amount of descriptive matter and a considerable number of tables. The yield tables have, however, been reconstructed, and have been simplified to make them more easily handled in predicting the amount of future crops.

The most instructive chapter in the book is probably that which discusses the loss incurred by ordinary methods of lumbering. By measurements taken in the woods, it is shown that the loss occasioned by cutting unnecessarily high stumps amounts to two per cent of the total product. Similarly the author shows that a considerable loss is occasioned by the unnecessary use of Spruce for skidways and by leaving large tops in the woods.

Throughout the book the author's statements are supported by numerous photographs, which add interest to the publication. The practical character of the book and the straightforward way in which it is written will make it sought for by all interested in conservative methods of handling timber lands in any part of the country.

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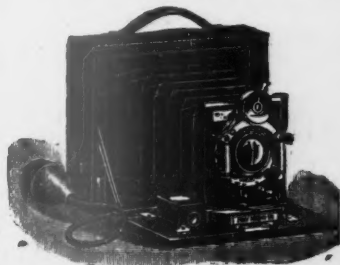
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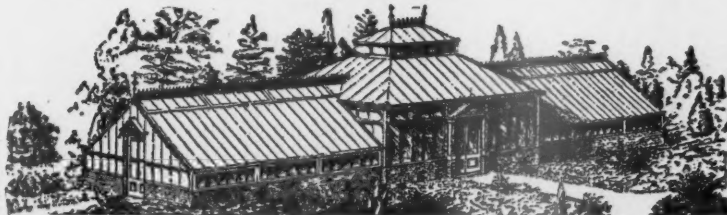
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